Facility Name: CAHOKIA / DEAD CREEK

Location: SAUGET, IL. (ST CLAIR COUNTY)

EPA Region: 5

Person(s) in Charge of the Facility: _____

_____

_____

Name of Reviewer: C. E. Mays III   Date: 7/20/82

General Description of the Facility:

(For example: landfill, surface impoundment, pile, container;
types of hazardous substances; location of the facility;
contamination route of major concern; types of information
needed for rating; agency action, etc.)

Unlined creek bed – the surrounding area had several
landfills operating in the creek's vicinity since 1937 to
the 1960's. Site is surrounded on the north by several
large companies which have been operating since the 1900's.

Scores: S_M = ~~8.70~~ 18.48   (S_{gw} = 4.24 S_{sw} = 7.55 S_a = ~~12.31~~ 36.77)

S_{FE} = 30.00

S_{DC} = 50.00

Figure 1

HRS COVER SHEET

QC
Math error under
air pathway
Michael O'Toole
RRS II   8/11/82

GROUND WATER ROUTE WORK SHEET

Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 OBSERVED RELEASE	0 (45)	1	**45**	45	3.1
If observed release is given a score of 45, proceed to line **4**. If observed release is given a score of 0, proceed to line **2**.					
2 ROUTE CHARACTERISTICS					3.2
Depth to Aquifer of Concern	0 1 2 3	2		6	
Net Precipitation	0 1 2 3	1		3	
Permeability of the Unsaturated Zone	0 1 2 3	1		3	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score			N/A	15	
3 CONTAINMENT	0 1 2 3	1	N/A	3	3.3
4 WASTE CHARACTERISTICS					3.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	(0) 1 2 3 4 5 6 7 8	1	0	8	
Total Waste Characteristics Score			18	26	
5 TARGETS					3.5
Ground Water Use	0 (1) 2 3	3	3	9	
Distance to Nearest Well/Population Served	(0) 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
Total Targets Score			3	49	
6 If line **1** is 45, multiply **1** x **4** x **5** If line **1** is 0, multiply **2** x **3** x **4** x **5**				57,330	
7 Divide line **6** by 57,330 and multiply by 100			S_{gw} = **4.24**		

Figure 2

Ground Water Route Work Sheet

10

$45 \times 18 \times 3 = 2430 = GW$

$$\frac{GW}{57330} \times 100 = 4.24$$

GROUND WATER ROUTE WORK SHEET

Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 OBSERVED RELEASE	0 (45)	1	**45**	45	3.1

If observed release is given a score of 45, proceed to line **4**.
If observed release is given a score of 0, proceed to line **2**.

2 ROUTE CHARACTERISTICS					3.2
Depth to Aquifer of Concern	0 1 2 3	2		6	
Net Precipitation	0 1 2 3	1		3	
Permeability of the Unsaturated Zone	0 1 2 3	1		3	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score			N/A	15	

3 CONTAINMENT	0 1 2 3	1	N/A	3	3.3

4 WASTE CHARACTERISTICS					3.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	(0) 1 2 3 4 5 6 7 8	1	0	8	
Total Waste Characteristics Score			18	26	(26)

5 TARGETS					3.5
Ground Water Use	0 (1) 2 3	3	3	9	
Distance to Near- est Well/Population Served	(0) 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
Total Targets Score			3	49	

6 If line **1** is 45, multiply **1** x **4** x **5** If line **1** is 0, multiply **2** x **3** x **4** x **5**		57,330

7 Divide line **6** by 57,330 and multiply by 100	S_{gw} = 4.24	

Figure 2

Ground Water Route Work Sheet

10

$$45 \times 18 \times 3 = 2430 = GW$$

$$\frac{GW}{57330} \times 100 = 4.24$$

6.12

SURFACE WATER ROUTE WORK SHEET

Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 OBSERVED RELEASE	0 (45)	1	**45**	45	4.1

If observed release is given a value of 45, proceed to line **4**.
If observed release is given a value of 0, proceed to line **2**.

Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
2 ROUTE CHARACTERISTICS					4.2
Facility Slope and Intervening Terrain	0 1 2 3	1		3	
1-yr. 24-hr. Rainfall	0 1 2 3	1		3	
Distance to Nearest Surface Water	0 1 2 3	2		6	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score			N/A	15	
3 CONTAINMENT	0 1 2 3	1	N/A	3	4.3
4 WASTE CHARACTERISTICS					4.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	(0) 1 2 3 4 5 6 7 8	1	0	8	
Total Waste Characteristics Score			18	26	
5 TARGETS					4.5
Surface Water Use	0 1 (2) 3	3	6	9	
Distance to a Sensitive Environment	(0) 1 2 3	2	0	6	
Population Served/ Distance to Water Intake Downstream	(0) 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
Total Targets Score			6	55	

6 If line **1** is 45, multiply **1** x **4** x **5** If line **1** is 0, multiply **2** x **3** x **4** x **5**				64,350
7 Divide line **6** by 64,350 and multiply by 100	S_{sw} - 7.55			

Figure 7

Surface Water Route Work Sheet

28

$$45 \times 18 \times 6 = 4860 = Sw$$

$$\frac{Sw}{64350} \times 100 = 7.55$$

SURFACE WATER ROUTE WORK SHEET

Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 OBSERVED RELEASE	0　(45)	1	45	45	4.1

If observed release is given a value of 45, proceed to line **4**.
If observed release is given a value of 0, proceed to line **2**.

2 ROUTE CHARACTERISTICS					4.2
Facility Slope and Intervening Terrain	0 1 2 3	1		3	
1-yr. 24-hr. Rainfall	0 1 2 3	1		3	
Distance to Nearest Surface Water	0 1 2 3	2		6	
Physical State	0 1 2 3	1		3	
Total Route Characteristics Score			N/A	15	
3 CONTAINMENT	0 1 2 3	1	N/A	3	4.3
4 WASTE CHARACTERISTICS					4.4
Toxicity/Persistence	0 3 6 9 12 15 (18)	1	18	18	
Hazardous Waste Quantity	(0) 1 2 3 4 5 6 7 8	1	0	8	
				26	
Total Waste Characteristics Score			18	26	
5 TARGETS					4.5
Surface Water Use	0 1 (2) 3	3	6	9	
Distance to a Sensitive Environment	(0) 1 2 3	2	0	6	
Population Served/ Distance to Water Intake Downstream	(0) 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
Total Targets Score			6	55	
6 If line **1** is 45, multiply **1** x **4** x **5** If line **1** is 0, multiply **2** x **3** x **4** x **5**				64,350	
7 Divide line **6** by 64,350 and multiply by 100			S_{sw} = 7.55 /0.9		

Figure 7

Surface Water Route Work Sheet

28

$45 \times 18 \times 6 = 4860 = SW$

$$\frac{SW}{64350} \times 100 = 7.55$$

AIR ROUTE WORK SHEET

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. (Section)
[1] OBSERVED RELEASE	0 (45)	1	45	45	5.1

Date and Location: 3/23/82   Northern Dead Creek

Sampling Protocol: Check for spots above background
2- HNU photo-ionizers & 1- OVA

If line [1] is 0, then S = 0. Enter on line [6].
If line [1] is 45, then proceed to line [2].

[2] WASTE CHARACTERISTICS					5.2
Reactivity and Incompatibility	0 (1) 2 3	1	1	3	
Toxicity	0 1 2 (3)	3	~~9~~ 9	9	
Hazardous Waste Quantity	(0) 1 2 3 4 5 6 7 8	1	0	8	
	Total Waste Characteristics Score		10 ~~X~~	20	

[3] TARGETS					5.3
Population Within 4-Mile Radius	0 9 12 15 18 (21) 24 27 30	1	21	30	
Distance to Sensitive Environment	(0) 1 2 3	2	0	6	
Land Use	0 1 2 (3)	1	3	3	
	Total Targets Score		24	39	

[4] Multiply [1] x [2] x [3]				35,100	

[5] Divide line [4] by 35,100 and multiply by 100 $S_a = $ ~~12.31~~

30.77

Figure 9

Air Route Work Sheet

$$10$$
$$45 \times \cancel{X} \times 24 \quad = 10800 \quad 38$$
$$= 4320 = A$$

$$\frac{A}{35\,100} \times 100 = \frac{30.77}{12.31}$$

	s	s²
Groundwater Route Score (S_{gw})	4.24	17.98
Surface Water Route Score (S_{sw})	7.55	57.00
Air Route Score (S_a)	~~12.37~~ 36.72	946.80 ~~151.54~~
$S_{gw}^2 + S_{sw}^2 + S_a^2$	////	1021.78 ~~226.52~~
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$	////	31.97 15.05
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} \Big/ 1.73$	////	18.48 S_M = ~~8.70~~

Figure 10

WORKSHEET FOR COMPUTING S_M

	S	s^2	
Groundwater Route Score (S_{gw})	~~6.72~~ 4.24	17.98	37.45
Surface Water Route Score (S_{sw})	~~10.91~~ 7.55	57.00	119
Air Route Score (S_a)	~~12.37~~ 30.7?	~~946.50~~ ~~51.84~~	
$S_{gw}^2 + S_{sw}^2 + S_a^2$	////////	~~1021.18~~ 226.52	
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$	////////	~~31.99~~ 15.05	
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}\ /\ 1.73$	////////	~~18.46~~ $S_M = 8.70$	192?

Figure 10

WORKSHEET FOR COMPUTING S_M

FIRE AND EXPLOSION WORK SHEET

Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Containment	1 ③	1	3	3	7.1
2 Waste Characteristics					7.2
Direct Evidence	0 ③	1	3	3	
Ignitability	0 1 2 ③	1	3	3	
Reactivity	0 ① 2 3	1	1	3	
Incompatibility	0 ① 2 3	1	1	3	
Hazardous Waste Quantity	⓪ 1 2 3 4 5 6 7 8	1	0	8	
Total Waste Characteristics Score			8	20	
3 Targets					7.3
Distance to Nearest Population	0 1 2 ③ 4 5	1	3	5	
Distance to Nearest Building	0 1 ② 3	1	2	3	
Distance to Sensitive Environment	⓪ 1 2 3	1	0	3	
Land Use	0 1 2 ③	1	3	3	
Population Within 2-Mile Radius	0 1 2 3 4 ⑤	1	5	5	
Buildings Within 2-Mile Radius	0 1 2 3 4 ⑤	1	5	5	
Total Target Score			18	24	
4 Multiply [1] × [2] × [3]				1,440	
5 Divide line [5] by 1,440 and multiply by 100			S_{FE} = 30.0		

Figure 11

Fire and Explosion Work Sheet

48

$3 \times 8 \times 18 = 432 = FE$

$$\frac{FE}{1440} \times 100 = 30$$

DIRECT CONTACT WORK SHEET

Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. (Section)
1 Observed Incident	0 (45)	1	45	45	8.1
If line [1] is 45, proceed to line [4] If line [1] is 0, proceed to line [2]					
2 Accessibility	0 1 2 3	1		3	8.2
3 Containment	0 15	1		15	8.3
4 Waste Characteristics Toxicity	0 1 2 (3)	5	15	15	8.4
5 Targets					8.5
Population within a 1-mile radius	0 1 2 3 (4) 5	4	16	20	
Distance to a critical habitat	(0) 2 3	4	0	12	
Total Targets Score			16	32	
6 If line [1] is 45, multiply [1] x [4] x [5] If line [1] is 0, multiply [2] x [3] x [4] x [5]				21,600	
7 Divide line [6] by 21,600 and multiply by 100			S_{DC} = 50		

$$45 \times 15 \times 16 = 10800 = DC$$

$$\frac{DC}{21600} \times 100 = 50$$

Figure 12

Direct Contact Work Sheet

56